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ABSTRACT

Gender differences in the field of instructional technology were investigated to determine their effects on female students and specifically on the scarcity of scholarly contributions by women to the field as well as the lack of research studies on women's contributions The following issues were examined to determine the status and interests of women in the field: (1) the number of women currently in the field in the United States; (2) the number of publications by women in the leading journals of the field; and (3) the topics of these publications. Through content analysis, 78 categories of topics were selected, and 11 journals were identified as important in instructional technology, and reviewed for 1988 through 1992. In the past year, the Association of Educational Communication and Technology counted 1,632 members identifiable as women by their names (about 40% of the membership). There were 702 articles written by women in the period studied, with the most frequent topics being computer use, instructional design or development, and training. Although this study is preliminary and raised many questions for further research, it is felt that these findings help to illuminate the question of the number of women in the field and the content of their written publications. (Contains 19 references.) (SLD)

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An Analysis of the Scholarly Contributions of Women Instructional Technology Professionals

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Last year, as a new student in an unfamiliar field, Instructional Technology or Instructional Design, Development and Evaluation as it is called at Syracuse University, I found myself confronted with much new, and sometimes confusing, information, and I was exposed to many new concepts and approaches to instruction. Compared to my previous experiences in elementary education, this field was rather precise and technical. I began to explore some of the causes of my difficulties with other students in the program and through outside readings. Among other concerns that I found in the literature gender differences, both in terms of education in general and instructional technology in particular, began to interest me. In examining my own introductory coursework I found that while all of my classes were comprised disproportionately of female students, all of the instructors in the department were males; all the literature I was assigned to read was written by males; and the leaders in the field that were mentioned in my courses were almost all males. In conversations with colleagues, the effects of gender differences, in terms of different communication styles, analytic approaches and problem solving techniques, seemed a possibility as one of the sources of difficulty in absorbing all that was new in the field of instructional technology. With the help of a colleague we decided to formally investigate the gender issue in the field of instructional technology to determine if the informal impressions made during my first year of studies was unique to our institution.

RATIONALE

To date we have found no studies that specifically look at women's contributions to the literature in the field of instructional technology. Hannafin (1991) reviewed the scholarly productivity of instructional technology faculty. Ely (1992) has used a content analysis of the literature to identify the trends in instructional technology over a three part series that has spanned five years. In both studies women have not been isolated to determine if they are publishing in proportion to their numbers or if their writings reflect trends similar to those of the field in general.

There have been several reasons suggested for the lack of involvement of women in technology. One of these reasons is the different communication styles of men and women. Much continues to be written about the differences in communication styles between men and women. Men tend to see relationships in terms of right and wrong, (Kerr, 1990). and adopt a power-oriented style often distancing themselves from the audience. Women, on the other hand, have been trained to defer to power, to take care of and protect others, focusing on human relationships (Kerr, 1990) with emotional expression being highly valued (Lakoff, 1983). Technical terms that are used to discuss equipment, software, and analyze systems are frequently used in the field of instructional technology. Technical terminology serves several purposes: it gives members of the field a common language; it distinguishes between novices and experts in the field; it separates those who understand the language from those who don't; and it provides a common reference point from which those within the field can clarify meaning.

The style of communication used in technological terminology, an exaggeration of the masculine style of communication, eliminates all emotional and subjective judgment (Lakoff, 1983). Because technical terminology is presented in a masculine style, it is relatively easier for men to adopt and possibly leaves women feeling uncomfortable or unable to communicate on an equal basis.

Not only do women feel uncomfortable with technology, in many instances there exists actual prejudice against women in technology (Josefowitz, 1983). This prejudice may be reinforced by society's stereotypes. The pervasive attitude that women and machines don't or shouldn't mix is a further hindrance to women in the fields of technology. In addition to the general prejudice against women and technology, instructional technology creates confusion by giving a mixed gender message. Combining the field of instruction, which has traditionally been predominantly female and the field of technology, a field traditionally predominantly male, can further add to women's feelings of discomfort with the field.

One of the purposes of instructional technology is to support education through the design, development and evaluation of curriculum and the use of technology in instruction and learning, yet the diffusion of technology into education has not been as rapid as in other parts of society (Kerr, 1990). One possible cause of this lack of diffusion is gender differences. Traditionally professional education positions in grades K-12 have been held by women. In 1990, Kerr found that 70% of teachers are women. Many women are still not comfortable with machines (Bentson, 1983) despite often having to rely on computers, VCRs, and other equipment to perform their jobs. With the introduction of more and more technology in the schools teachers can no longer avoid this uncomfortable relationship with technology and in fact should come face to face with the reasons the difficulty still exists (Canada, 1991).

RESEARCH QUESTIONS

This presentation begins to examine women's contributions to the published journals in the field of instructional technology as a format for written communication. As an introductory study of the issue of gender and instructional technology in the United States, this research investigates (1) the number of women currently in the field of instructional technology; (2) the number of publications of women in the leading journals in the field; and (3) the topics of these written publications, to determine specifically the status and interests of women in the field. As Canada (1991) contends, to continue to ignore the technological gender issue can only lead to a widening of the differences that currently exist.

Women in instructional technology today are in a position to eradicate stereotypes that have been held for centuries, yet still they are not prominent in the literature. This presentation employs some of the methods used by Hannafin (1991) and Ely (1992) to specifically study American women in the field of instructional technology by investigating the following questions: (1) What percentage of articles in professional journals in the field of instructional technology are written by women? (2) What

topics are women writing about in the field of instructional technology? Further research questions of this study investigate the status of women in instructional technology in terms of: (3) What percentage of members of AECT are women? (4) What percentage of graduate students currently enrolled in instructional technology programs are women? The purpose of these questions is to determine if the numbers of women in the field of instructional technology justify a need to further explore gender issues. A predominantly male field would naturally be expected to have publications written by men. By determining the number of women currently involved in the field it is possible to identify any differences between the proportions of professional women (graduates) in the field and the number of women students currently entering the field. This study investigates the current status and interests of women in the field of instructional technology, as expressed in the current journal literature, as a possible foundation for further study on gender issues and instructional technology.

METHODOLOGY

Content analysis was selected as a technique for making both qualitative and quantitative inferences about the literature written by women by objectively and systematically identifying characteristics of the literature (Carney, 1972). Applying this methodology to our study gave us the flexibility to discover qualitatively the topics of interest to women writing in the professional journals in the field while at the same time giving us the ability to categorize the topics in order to compare them quantitatively. Because validity and reliability are recognized as possible weaknesses of content analysis due to ambiguity of category definitions and subjectivity of the coding (Weber, 1990), this study sought to account for these weaknesses by using two coders working together closely to determine and define categories. Coding was done independently, yet simultaneously by the coders to allow for immediate discussion and negotiation of category placement.

The 78 categories used in this study were based initially on those defined by Ely in his content analysis of the literature of the field (Ely, 1992). Using Anglin's list of professional journals in the field of instructional technology (Anglin, 1991), eleven journals were selected based on: (1) publication in the United States to eliminate possible cultural bias as a source of topics; and (2) availability of the last five years of the journals on campus at Syracuse University. All of the articles in each journal were counted. Those articles that were authored by women as either the first or second author were counted separately. Those articles where women were third authors or beyond were not counted based on the bibliographic practice of not listing more than two authors in a bibliographic notation. Those articles where the first and second author's names were either unfamiliar or not gender specific were placed in the "unknown" category and subtracted from the total number of articles. The percentage of articles written by women was determined for each individual year from 1988 to the present and for the composite five years for each journal. Each article with a first or second female author was analyzed for content and placed in one or two of the predetermined categories independently by the two coders.

When an article did not conform to one of the predetermined categories, a third undetermined category was created allowing the coder to select a new topic that uniquely fit the article. While the creation of new categories was rare, this flexibility allowed the coder to acknowledge the specific topic of the articles without forcing them to conform to the predetermined categories created before the analysis began.

Further investigation of the status of women in the field of instructional technology was done in terms of the proportion of female students currently studying in the field. Twenty colleges and universities throughout the United States offering graduate programs in instructional technology were contacted from the list of professors currently attending the Professors of Instructional Design and Technology (PIDT) meetings to obtain the total number of students and the number of female students currently enrolled in their programs; of these 20 there were 16 responses. The AECT's membership list was examined to determine the proportion of women professionals currently in the field. Individual members were counted and organizations, institutions, and names that were not gender specific were eliminated from the total.

PRELIMINARY FINDINGS

Our investigations revealed results in answer to the following questions: (1) What percentage of articles in professional journals in the field of instructional technology were written by women?

PERCENT OF ARTICLES WRITTEN BY WOMEN OVER A FIVE YEAR PERIOD

JOURNAL TITLE	1988 %	1989 %	1990 %	1991 %	1992 %	MEAN %	RANGE
Journal of Educational Computing Research	57.7	72.0	40.7	55.0	42.8	54.5%	31.3
American Journal of Distance Education	38.0	40.9	64.2	47.3	37.5	45.2%	26.7
Performance Improvement Quarterly	36.4	26.9	58.3	52.9	45.5	41.6%	31.4
TechTrends	41.0	25.0	44.4	36.4	61.1	39.7%	36.1
Educational Communication & Technology; Educational Technology Research & Development	42.9	23.3	60.0	50.5	19.2	39.2%	40.8
Journal of Research on Computing in Education	28.6	45.7	33.3	45.4		38.3%	27.1
Performance & Instruction	40.0	38.5	33.3	31.3	28.4	35.2%	11.6
Educational Technology: Magazine for Managers of Change	32.1	37.2	27.5	21.4		29.8%	15.8
Training	33.9	28.9	27.3	24.6	22.7	28.8%	11.2
Journal of Educational Technology Systems	22.7	25.9	28.1	38.5	12.5	26.5%	26.0
Technical Horizons in Education	29.4	19.6	33.3	16.1		24.2%	17.2
ANNUAL MEANS	36.6	34.9	40.9	38.1	33.7		

TABLE 1

The eleven journals used in this research provided the statistics summarized in Table 1 above. Percentages of women's journal publications ranged from a high of 72% in the 1989 Journal of

Educational Computing Research to a low of 12.5% in the 1992 Journal of Educational Technology Systems. The median of the 52 percentages was 36.4%; the mode was 33.3%; the mean percentage was 36.4%. The annual mean percentage of the eleven journals ranged from a high of 40.9% in 1990 to a low of 33.7% in 1992. The five year mean average for each of the eleven journals was calculated.

(2) What topics were women writing about in journals in the field instructional technology?

RECORDING UNITS CONTENT ANALYSIS

CATEGORY	f	%
Computers	72	10
Design & Development	57	8.1
Training *	49	7.0
Computer Assisted Instruct.	34	4.8
Telecommunications	29	4.1
Management	21	3.0
Gender Issues	19	2.7
Theory Application	19	2.7
Hypermedia	18	2.6
Program Evaluation	18	2.6
Video/Audiotapes	16	2.3
Status of Field	16	2.3
Research	15	2.1
Attitudes *	15	2.1
Product Evaluation	15	2.1
Diffusion/Dissemination	15	2.1
Expert Systems	14	2.0
Model Construction	14	2.0
Message Design	14	2.0
Teacher Education *	14	2.0
Distance Education	13	1.8
Multicultural	12	1.7
Television	11	1.6
Other	11	1.6
Networks	10	1.4
Computer Software	10	1.4
Interactive Video	10	1.4

CATEGORY	f	%
Needs Analysis	9	1.3
Adult Education *	8	1.1
Finance/Cost Analysis	8	1.1
Media	8	1.1
Leadership Qualities	7	1.0
Cognitive Theory	7	1.0
Effects of Technology	7	1.0
Simulations	6	.8
Learner Characteristics	6	.8
K-12 Education *	6	.8
Motivation	5	.7
Implementation	5	.7
Task Analysis	4	.6
Learning Strategies	4	.6
Individuals of Note	4	.6
Lib./Med. Spec./Centers *	4	.6
Instructional Strategies	3	.4
Roles & Responsibilities	3	.4
Definitions	3	.4
Ethics	3	.4
Minorities	3	.4
Performance Technology	3	.4
Programming	2	.3
Tutorials	2	.3
Front End Analysis	2	.3
Future of Field	2	.3
Professional Education	2	.3

CATEGORY	f	%
Facilities	1	.1
Policies	1	.1
Problem Solving	1	.1
Personnel Evaluation	1	.1
Behavioral Theory	1	.1
Research Proposals	1	.1
International Programs	1	.1
Visual Literacy *	1	.1
Human Res. Development *	1	.1
Achievement Tests *	1	.1
Interpersonal Skills *	1	.1
Quality Control *	1	.1
History of Field	1	.1
Personnel	1	.1
Society and Culture	1	.1
Computer Drill & Practice	0	0
Design Context	0	0
Objectives	0	0
Content	0	0
Media Selection	0	0
Cooperative Groups	0	0
Humanistic Theory	0	0
Radio	0	0
Computer Games	0	0

TABLE 2

The three most frequent topics of the 702 articles written by women in the field of instructional technology from 1988 to the present were Computers, 10.2% with 24 out of 72 articles in Educational Technology; 14 in Journal or Research in Computing Education; and 12 in Technical Horizons in Education Journal; Instructional Design and/or Development, 8.1% with 20 out of 57 total articles in Performance and Instruction and 15 in Educational Technology; and Training, 4.0%. with 26 out 49 total articles found in the journal, Training. Other large frequencies of topics include American Journal of Distance Education, 10 out of 29 total articles on Telecommunications; and Performance and Instruction, 15 out of 21 total articles on Management. Two categories, Individuals of Note and Library Media Centers and/or Specialists were found exclusively in Training and TechTrends, respectively.

Further frequencies for the 78 categories are found in Table 2 above. Starred categories were those that were created to accommodate specific topics that had not been created before analysis began.

(3) What percentage of members of AECT were women? An analysis of the AECT membership list for the past year found 3997 names of members in the United States and its territories; 178 names were not gender specific; and 1632 members who were women. During the past year 40.8% of the members of AECT from the United States and its territories were women. Analysis of the full membership list including countries outside of the United States found 4141 total members; 260 names not gender specific; and 1665 members who were women. 40.2% of all members of AECTwere women.

(4) What percentage of students currently enrolled in instructional technology graduate programs in the United States are women?

PERCENTAGE OF WOMEN IN INSTRUCTIONAL TECHNOLOGY PROGRAMS 1992

INSTITUTION	%
University of Georgia	76.0%
University of N. Carolina, Wilmington	73.9%
University of Iowa	70.0%
Ohio State University	66.1%
University of Northern Colorado	64.4%
San Diego State University	62.2%
Indiana University	60.7%
University of Minnesota	60.0%
Northern Illinois University	59.3%
Syracuse University	59.3%
Florida State University	58.1%
Pennsylvania State University	56.6%
University of Colorado	55.9%
University of Pittsburgh	52.6%
University of Cincinnati	50.0%
Virginia Tech	36.8%

TABLE 3

Responses from 16 colleges and universities throughout the United States revealed a range from a high of 76% at the University of Georgia to a low of 36.8% at Virginia Tech were women. The average number of female students was 60.1% and the median percentage was 60.0%

DISCUSSION

The percentage of instructional technology journal articles written by women followed no consistent pattern of increase or decrease within each journal from year to year. Educational

Technology Research and Development had the widest range of percentages, 40.8, over the five year period; the lowest range of percentages, 11.2, occurred in the journal, Training. The Journal of Educational Computing Research was the only publication in this study that averaged over 50% of their articles written by women. Only three of the journals, Journal of Educational Computing Research, American Journal of Distance Education, and Performance Improvement Quarterly, averaged equal to or over the percentage of women members in AECT. None of the journals had an average percentage of articles written by women equal to or above the average percentage of women students currently enrolled in instructional technology programs in the United States. In general, the figure revealed a disappointing number of articles being written by women in the instructional technology journals with no sign of a pattern of change or improvement. Questions that arise from these findings include: What are the policies for accepting articles for publication for each journal? What percentage of editors and editorial boards are women and does that affect the number of articles written by women that are accepted by the journal? For example, one journal, Training, has an assistant editor who is a woman, who wrote 57.4% of the articles by women in 1988; 77.9% in 1989; 60.0% in 1990; and 64.3% in 1991. This one author greatly affected the total percentages of articles written by women for this journal. Further questions include: What are the number of articles submitted by women as compared to the number of articles that are accepted for publication? Is there another medium women are using to disseminate their written communication?

In reviewing the topics women are writing about we tried to be as specific as the article would allow. The broad category of Computers was avoided whenever a more specific topic would apply, yet this category was the most popular topic for articles written by women. Despite the impression found in the literature that men are more technical than women this study revealed that women's journal publications in instructional technology were predominantly of a technological nature. Categories concerning topics such as Ethics, Individuals of Note, Effects of Technology and Learning Theory and Strategies had less than 10 citations each. Articles by women found in the journals written for the business community seemed to directly address issues of multiculturalism, diversity and gender rather than treating these topics as adjuncts to studies of the use of technology.

The category of Instructional Design and Development was combined because of the lack of consensus within the field in defining and using these terms. Consistency within journals regarding the definitions of these terms was not noted. Further confusion resulted in the use of the terms, training and education. In this case we placed the articles in categories using the terminology adopted by the author and created a new category for the term Training. Teacher training and teacher education were both placed in the new category, Teacher Education. The introduction of the phrase Performance Technology caused some confusion and was never clarified in the articles that were reviewed so that a new category was created to accommodate articles using this phrase. Generally, it was felt that a consistency in definition and use of terminology would be beneficial to the development and growth of the field.

Further it was found that the two sides of the field, business and education, were addressing many of the same issues although sometimes using different terminology and they had more in common than we formerly believed.

Although the numbers in Table 2 don't reveal the secondary categories, or contexts of the articles, it was noted that more articles than are indicated were written about K-12 Education and the use of technology with or by children and students. Another secondary category , that of programming and the use of LOGO, was noted within the category for Computers. Frequent citations were noted concerning teaching and using programming skills in K-12 education to improve students' learning and problem solving strategies.

The percentages revealed by analyzing the membership list of AECT and the enrollment figures of 16 universities showed a marked difference between the percentage of students studying in the field of instructional technology and those who have joined one of the leading organizations in the field. Questions that arise are: Is the percentage of women in the field rising? Are women in the field not joining this particular professional organization? What is the percentage of women members in other instructional technology organizations? Is the percentage of women currently studying instructional technology a reflection of the overall percentage of women studying in graduate degree programs or is it unique to the field? Are the numbers of women studying in instructional technology programs an indication of an increase in women entering the field?

The findings in this study are preliminary due to incomplete data for the year 1992. Final analysis will be completed when all data is available. It is felt that further data needs to be collected on other professional organizations within the field of instructional technology. Where as this study raised many questions for further research, it is felt that the findings help to illuminate the status of the number of women in the field and the content of their written publications.

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